Pilot operated diaphragm valve Type BR40

Operating and installation instructions

This is a translation of the original German version of the operating and installation instructions in its version as of 01/2020

Foreword

These Operating and Installation Instructions assist in the proper, safe and economic use of the pilot diaphragm valve BR40, called valve for short. It is intended for any person that uses, operates, handles, services and cleans this valve. It particularly applies to customer service technicians, trained professionals and qualified and authorized personnel.

Each of these individuals must have read and understood these Operating and Installation Instructions. Always keep these operating and installation instructions within reach of the valve. Following the instructions in this manual helps avoid dangers and increase the reliability and service life of the valve.

In addition to these Operating and Installation Instructions, you must comply with the mandatory regulations relevant to accident prevention as well as the recognized technical rules for the safe and professional work applicable in the country and place of use.

Availability

You can request a new copy of these Operating and Installation Instructions from GSR Ventiltechnik GmbH & Co. KG if these are lost or become unusable. Enclose these Operating and Installation Instructions when you sell the valve or pass it on in any other way.

Design features used in the text

Various elements of these Operating and Installation Instructions use specific design features. These help to easily distinguish between the following elements:

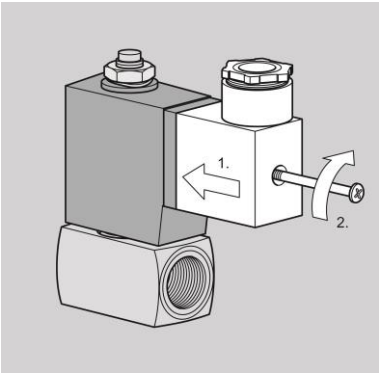
Normal text

- Bulleted list
- Action step

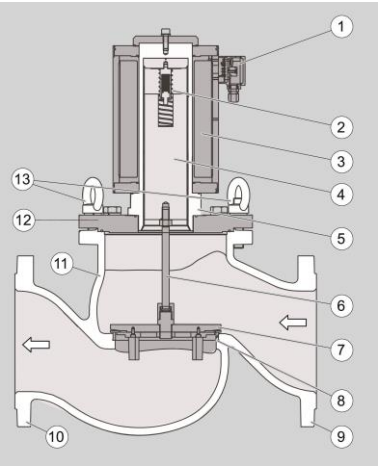
Tips contain additional information on the economic use of the valve.

Formatting attributes in figures

The figures contain illustrations in different shades of grey. Elements, that are important for an action previously described are highlighted in white. Movements to be carried out are made clear using movement or directional arrows. If several handling steps are shown in a figure, the sequence is made clear using numbers
(1., 2., …):



References to elements in a legend or running text are indicated by position numbers (1), (2), etc.:



Contact with manufacturer

If this manual leaves any of your questions unanswered, contact:

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Contents

Safety

Proper use

The purpose of the valves is to shut off liquid or gaseous media flows. The media must be compatible with the materials from which the housing and seals are made. The valves must only be installed in the flow direction indicated.

Proper use also includes the observance and compliance with all specifications in these instructions, in particular the safety instructions. Any other use or use going beyond this is considered improper use.

Improper use

GSR Ventiltechnik GmbH & Co. KG cannot be held liable for damage arising from improper use.

Notes on residual risks

This valve has been built using state-of-the-art technology and according to the generally recognised rules of technology and applicable standards.
Sources of danger have been designed out from the outset, or rendered harmless by using appropriate protective equipment.

Despite this however, operation of the valve is still not entirely risk free.
The following conditions may pose a risk to persons or lead to impaired performance of the valve and other material assets:

- If the valve is fitted, operated or serviced by insufficiently qualified personnel.
- If the valve is used for a purpose other than its intended purpose.

Prohibition of unauthorized constructional changes and modifications

- Do not perform unauthorised conversions or modifications to the valve. Conversions or modifications without the consent of GSR Ventiltechnik GmbH & Co. KG are not permitted.
- Never bridge or bypass existing protective equipment.

Personal protective measures

- Wear protective gloves in accordance with EN388.
- Wear protective footwear according to EN20345 S1 or EN20345 S2.

Basic safety instructions

Avoiding risk of burns

Risk of burns from hot surfaces. The surface of the valve and other parts of the device may become very hot. This depends on the temperature of the media used and is particularly true for continuous operation.

- Wear protective gloves.
- Allow the valve and other parts of the system to cool before starting any maintenance or cleaning work.

Avoiding injuries due to pressure in the piping system

- Release the pressure from the piping system before maintenance or repair work.
- Do not perform any maintenance or repair work at the valves while they are under pressure.

Avoiding injuries due to electrocution

- Only qualified electricians may perform any work on the power supply.
- Turn off the power supply before starting any maintenance or repair work.
- Make sure that the electrical specifications specified on the nameplate are met.
- Protect the electrical connections from moisture.
- Ground the valve with a wire to the appropriate threaded holes.

Layout attributes of the danger notes

DANGER

Notes with the word DANGER warn against a dangerous situation which leads to severe injuries or death.

WARNING

Notes with the word WARNING warn against a dangerous situation which may lead to severe injuries or death.

CAUTION

Notes with the word CAUTION warn against a situation which may lead to minor injuries.

Layout attributes of notes on material and environmental damage

ATTENTION

These notes warn against a situation which leads to material or environmental damage.

Description of the valve

These Operating and Installation Instructions apply to the valve of the type BR40.

The flow direction of the valves is indicated by an arrow on the body.

Functional description

Pilot-operated diaphragm valves are distinguished by their simple, solid construction. A diaphragm is available as the sealing element.

For opening and closing, the valve requires a pressure difference between valve inlet and valve outlet. The minimum pressure required for this is specified in the associated technical data sheet as minimum pressure.

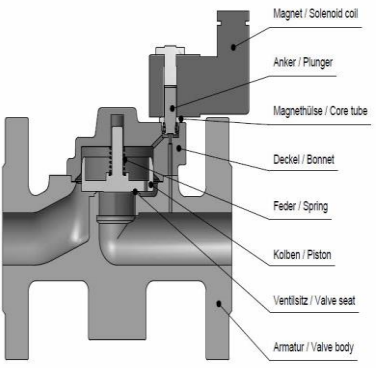
The valve actuator only has a pilot function through which the main sealing element (diaphragm) is relieved. The pressure difference lifts the main sealing element. This allows high pressures to be controlled with small solenoids at large nominal widths.

Servo-controlled diaphragm valves cannot be used in closed circuits. If in doubt, contact GSR.

Type NC

In the NC (Normally Closed) version, the valve is closed in the de-energized state. A spring closes the pilot orifice by means of the solenoid armature. The medium enters the control chamber via the bleed orifice and supports there the closing process. The pressure of the medium supports sealing of the diaphragm on the valve seat. When voltage is applied to the magnetic coil, the solenoid armature opens the pilot orifice and the pressure in the control chamber is reduced. The higher pressure under the diaphragm lifts it from the valve seat.

The valve opens.



Options

The following valve options among others are possible. Please talk to your GSR team if you require further products:

- De-energized open
- Armature compartment sealed
- Manual actuator.

Nameplate

The nameplate contains the following information:

- the manufacturer's mark
- the order number
- the valve designation
- the pressure range
- the companion dimension
- the nominal diameter
- the delivery date
- the connection voltage

The valve shows the following captive information:

- the production order number
- if applicable, the CE marking
- if applicable, the Atex marking

Installing the valve

Qualification of the personnel

Make sure that the installation work is only carried out by persons who have received training in the following areas:

- Connecting valves to pipes
- Welding of pipes
- Connecting valves to the power supply
- The safety regulations that apply at the place of operation.

Installing the valve in a pipe

You must fit the pipe ends before the valve can be fitted at the mounting location.

- Before fitting the valve, flush the pipes using a neutral medium at pressure intervals.
- Fit a dirt trap in front of each valve to stop it malfunctioning if the medium is contaminated.

ATTENTION

The valve and its attachments may be damaged.

➢ Do not use the the valve attachments, e.g. solenoid and solenoid sleeve, as levers.

CAUTION

Incorrect installation may damage the valve or equipment.

➢ Make sure the valve is mounted in the correct installation position.

➢ Make sure the valve is mounted in the correct flow direction.

➢ Make sure the drive chamber is not used as a lever.

- Put the valve in the fitting position.
- Connect the pipe ends to the connections on the valve.
- Tighten the connections of the pipe ends.

CAUTION

Risk of burns due to hot surfaces. The valve and solenoid may become hot when in operation.

➢ Wear protective gloves.

- If the valve is in an easily accessible location, fit a guard to prevent accidental contact.

ATTENTION

Possible damage due to overheating of solenoid.

➢ Do not insulate the solenoid.

- Make sure AC solenoids rest on the tube when you put them into operation.

Electrical installation

ATTENTION

Damage to electrical components of valve.

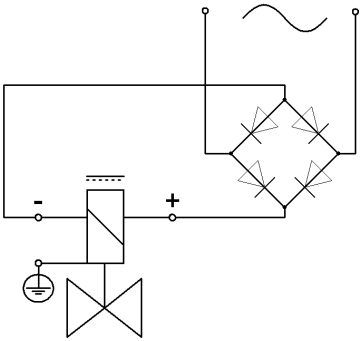
➢ Make sure that the correct voltage is supplied to the electrical components.

- Make sure that the plug is freely accessible.

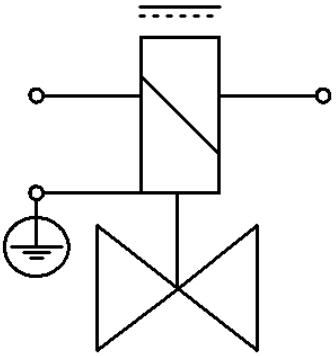
Wiring diagram

Follow the wiring diagram when connecting the power supply. Follow the directions on the nameplate.

Wiring diagram for DC voltage and direct connection to AC



Wiring diagram with an upstream voltage rectifier for AC



- Make sure that magnetic coils operating with switching electronics or a voltage rectifier are connected accordingly.

Operating the valve

As there is no general procedure for bringing the valve into operation that can be applied in all cases, you should agree on the method to be used with the owner/operator of the system.

CAUTION

Risk of burns due to hot surfaces. The valve and solenoid may become hot when in operation.

- ➢ Wear protective gloves.

ATTENTION

Possible damage to the solenoid due to high temperature.

- ➢ Make sure AC solenoids rest on the tube when you put them into operation.

Troubleshooting

Malfunction	Possible cause	Corrective action
Valve does not close.	The solenoid armature is blocked.	Clean the solenoid armature if it is dirty. Replace any damaged or defective parts.
	The pilot orifices in the piston are dirty.	Clean the pilot orifices.
	The direction of flow is wrong.	Mount the valve in the correct direction of flow.
	The nominal voltage is still applied. (Only applies to the NC version).	Check whether the electrical connection has been executed correctly. Connect the valve.
	The pressure difference between the connections P and A is too small.	Make sure that the flow rate is sufficient.
	The installation position is wrong.	Mount the valve in the correct installation position.
Valve does not open.	The solenoid armature is blocked.	Check whether the connection voltage is active. Clean the solenoid armature if it is dirty. Replace any damaged or defective parts.
	The connection voltage is interrupted or insufficient. (Only applies to the NC version).	Eliminate the cause of the interruption. Ensure a sufficiently high connection voltage.
	The solenoid coil or the rectifier is defective. (Only applies to the NC version).	Replace any defective parts.
	The nominal voltage differs from the coil voltage. (Only applies to the NC version).	Ensure that the nominal and coil voltages are identical.
	The relief orifice in the cover housing is clogged.	Clean the relief orifice.
	The relief orifice in the valve body is clogged.	Clean the relief orifice.

Maintenance and cleaning

- Check the valve for leaks at least every six months.
- Replace the set of seals if a leak is present.
- Check that the valve is functional at least every six months.
- Clean the valve regularly.
  The frequency at which the valve is cleaned depends on the medium and the operating conditions.

Qualification of staff

Make sure that maintenance and cleaning is only carried out by persons who have received training in the following areas:

- Removing valves
- Replacing seals
- Fitting valves
- Cleaning valves
- The safety regulations that apply in the country where the valve is operated.

Cleaning the valve

DANGER

Danger of death due to electric shock.

➢ Switch the power supply off before starting the cleaning work.

CAUTION

Risk of burns due to hot surfaces. The valve and solenoid may become hot when in operation.

➢ Wear protective gloves.

- Spray the fitting body with spray cleaner.
- Wipe the fitting body with a cloth.

Disassembling and storing the valve

Disassembling the valve

WARNING

Risk of injury posed by residual media in pipe.

- ➢ Follow the specifications in the safety data sheet for the medium.
- ➢ Wear suitable protective clothing for the medium being handled.
- ➢ Depressurize the pipe before starting work.

CAUTION

Risk of burns due to hot surfaces. The valve and solenoid may become hot when in operation.

- ➢ Wear protective gloves.

ATTENTION

The valve and its attachments may be damaged.

- ➢ Do not use the the valve attachments, e.g. solenoid and solenoid sleeve, as levers.

- Disconnect the valve from the power supply connection.
- Depressurise the pipe.
- Collect the medium that runs out in a suitable vessel

Proceed as follows to remove the valve:

- Detach the fitted valve from the pipe using a suitable tool.
- Remove the valve.

Storing the valve

- Store the valves in a clean dry place.

We recommend you keep the valves out of direct sunlight.

Disposing the valve

Make sure that the disposal of the valve does not result in an unnecessary environmental pollution or negative effects on health. In addition, promote the sustainable reuse of material resources.
If the valve has to be disposed of, please send it to a special waste disposal company. Only such companies have the experience to separate different materials.

- Remove the electrical connection.
- Release the pressure from the valve. Compressed air can be released into the atmosphere.
- Drain off the possible existing medium and dispose of it according to the environmental regulations.
- Remove the rubber and plastic parts on the valve.
- For disposal or recycling the separated parts, please deliver them to a waste disposal company.

Adhere to the local laws on disposal. If in doubt, please contact the responsible authorities.

Technical data

Type of control	Pilot-operated
Design	Seat valve with diaphragm seal
Connection	Sleeve connection G1/4 - G3 DIN ISO 228/1 (BSP) Further connections like NPT on request
Installation	Preferable with actuator upright
Pressure	0,3-20 bar(s. data sheet)
Medium	Clean, neutral, gaseous and liquid media
max. viscosity	22 mm²/s
Temperature range	Medium: -10 °C up to +80 °C Environment: -10 °C up to +50 °C Taking into account the limitations as described in the data sheet on page 4
Body material	Brass 2.0402 Stainless steel 1.4581
Metallic inner parts	Brass and stainless steel
Sealing	NBR, FKM, EPDM
Supply voltage	AC~ 24V, 110V, 230V DC= 12V, 24V Other supply voltages on request
Voltage tolerance	+10 % up to –10 %
Power consumption	.182 = DC 6,8 watts, AC 10,5 VA .032 = DC 11 watts, AC 15 VA .012 = 18 watts, AC 24 VA .148 = DC 10 watts, AC 8,5 VA Ex .178 = DC 5,2 watts, AC 5,3 VA Ex
Protection class	IP65 according to DIN 60529
Duty factor	100% ED-VDE 0580
Connection type	Device plug DIN 43650 ATEX coils: 3m connecting cable

Ex-proof	Ex m II T4 Other Ex degrees of protection upon request.